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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/772,102	02/04/2004	Sujeet Kumar	2950.21US02	4854

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EXAMINER	
KOSLOW, CAROL M	

ART UNIT	PAPER NUMBER
1755	

DATE MAILED: 08/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/772,102	KUMAR, SUJEET	
	Examiner	Art Unit	
	C. Melissa Koslow	1755	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 June 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14 and 16-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-14 and 33-37* is/are allowed.

6)☒ Claim(s) *16-22, 24-29 and 31-32* is/are rejected.

7)☒ Claim(s) *23 and 30* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

This action is in response to applicants' amendment of 20 June 2005. The amendment to the abstract has overcome the objection to the abstract. Applicant's arguments with respect to the rejections have been fully considered but they are not persuasive.

Claims 16-18 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention.

The added limitation that the powders are stirred during the contacting step where the oxide powder is converted to a sulfide powder is not found in the specification and thus is new matter. Applicants' point to page 19, line 28 through page 20, line 7 to support this addition, but this teaching is the apparatus used in the process of heat treating the oxide particles to modify the properties of the oxide particles, as can be seen the preceding paragraphs. The claimed process is taught on page 22, lines 2-9 and this section is silent as to the apparatus used in the conversion and there is no teaching of stirring. It is noted that there are no examples of the claimed process which could be used to support the stirring claim limitation.

The added limitation to claim 18 is new matter since its wording indicates the particles are polyhedral and not essentially spherical but the specification teaches, on page 22, lines 22-29, the particles are essentially spherical.

Applicants argue that one of ordinary skill in the art would understand that the sulfiding process would appropriately be performed in the discussed heat treating apparatus. Applicants' arguments are that one of ordinary skill in the art would have found it obvious to use the discussed heat treating apparatus for the discussed sulfiding process. Applicants have not

provided any evidence as to why it would have been obvious from reading the specification to use the taught heat treating apparatus in the taught sulfurizing process. In addition, the fact that it may have been obvious to use the taught heat treating apparatus in the taught sulfurizing process does not meet the requirements of written description requirement of the first paragraph of 35 USC 112. The standard is that the specification must reasonable convey to one of skill in the art that the inventor known at the time of invention knew at the time of invention one could perform the taught sulfiding process in the discussed heat treating apparatus. The rejection is maintained.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 18, 20, 21, 25 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. patent 6,699,406.

This reference teaches rare earth doped metal chalcogenide phosphor nanoparticles, where the metal is La or a Group II metal (col. 6, lines 5-10), which includes metal sulfides, such as strontium sulfide. The amount of rare earth dopant is up to 60 mol%, which overlaps the claimed range. Product claims with numerical ranges which overlap prior art ranges were held to have been obvious under 35 USC 103. *In re Wertheim* 191 USPQ 90 (CCPA 1976); *In re Malagari* 182 USPQ 549 (CCPA 1974); *In re Fields* 134 USPQ 242 (CCPA 1962); *In re Nehrenberg* 126 USPQ 383 (CCPA 1960). The nanosized particles have a size in the range of 1-100 nm (claim 13), which overlaps the claimed range. The reference teaches the particle are produced by precipitation, thus the particles are single crystals and therefore have crystal facets along the surface of the particles. In addition since there is no indication as to the shape of the

precipitated particles, one of ordinary skill in the art would expect them to inherently not be needle-shaped and thus to have an aspect ratio of less than 2, absent any showing to the contrary. This reference suggests the claimed collection of particles.

Applicants' argue that particles having a size of less than 1 micron do not overlap the claimed range. It is unclear how it does not overlap the claimed range since the claimed range of about 35-250 nm clearly falls within the range of less than 1000 nm. With respect to the teaching in column 4, line 29, the rest of the sentence teaches the "nanostructured" halides are formed by precipitation and from the discussion in column 5 and from what is known in the art, precipitates are either single crystal particles or agglomerates made up of single crystal particles where the agglomerates can be easily dispersed into the crystallite particles. Therefore, applicants' argument that the taught particles have an internal structure is not convincing. With respect to the crystal facet argument, this is not convincing since all halide precipitated particles have crystal facets along the surface since all of the taught halides have crystal facets due to the crystalline nature of the material unless they are specifically noted as being spherical. The rejection is maintained.

Claims 16, 27 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 00/66485.

This reference teaches making tungsten sulfide nanotubes by tungsten oxide powder, having an average particle size of at most 300 nm, with H_2S at 800-850°C to form a powder of tungsten sulfide nanotubes having a length of 0.2-20 microns (pg. 2, line 9-pg. 4, line 7). The taught size overlaps the claimed particle size range. Example 1 teaches producing a nanotube powder having a length in the range of 200-500 nm from oxide powder having a size of about 40

nm. The taught temperature range is less than the melting point of both tungsten oxides and tungsten sulfides. The reference teaches the process occurs in a reaction, which must be closed to only allow sulfidization to occur and the examples make it clear the reactant gases are flowed through the reactor container. While the reference does not teach the reaction occurs with stirring, one of ordinary skill in the art would have found it obvious to stir during the reaction to ensure all the particles are exposed to the dihydrogen sulfide gas. The reference suggests the claimed process.

Applicants simply argue that the Examiner has not established that stirring would be appropriate for the formation of nanotubes but have not presented any reason why the Examiners' rational is not applicable to the production of nanotubes nor have they presented any evidence that stirring cannot be used during the taught sulfurization process. The reason why applicants use stirring to ensure even heating for producing silver vanadium oxides particles is irrelevant to whether or not it would have been obvious to stir the nanotubes during sulfurization nor is it even relevant as to why applicants stir the particles during the claimed sulfurization process. The rejection is maintained.

Claims 16, 17, 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. patent 5,279,801.

This reference teaches producing rare earth or transition metal sulfide particles by contacting the metal oxide particles with CS_2 at 300-800°C, which is below the melting point of rare earth or transition metal sulfides and oxide and overlaps the range of claim 17. The reaction occurs in a sealed container and example 1 teaches the carbon disulfide flows through the container once the ampoule containing the gas is broken. The metal oxide particles have a size in

the range of 100 nm to 100 microns, which overlaps the claimed range. It is known in the art that sulfurizing does not change the size of the particle being sulfurized. While the reference does not teach the reaction occurs with stirring, one of ordinary skill in the art would have found it obvious to stir during the reaction to ensure all the particles are exposed to the carbon disulfide gas. The reference suggests the claimed process.

Applicants' arguments with respect to the gas flowing through the reaction are not convincing since the phrase "flowed through the closed container" is not limited in its meaning to gas flowing from outside the container, into the container and out again, but also includes flowing throughout a sealed container. One of ordinary skill in the would be expected to known that "granulometry" refers to particle size and thus the patent is using "grain size" to mean particle size, especially in fact the examples say powders of varying grain sizes. It is notoriously well known in the art that "grain" and "particle" are sometimes used as synonyms. The rejection is maintained.

Claims 16, 18, 21, 24, 25, 27, 29, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. patent 6,039,894.

This reference teaches producing metal sulfide phosphor particles, where the metal is zinc, zinc and cadmium, strontium or calcium, by contacting the metal oxide precursor particles with dihydrogen sulfide gas (table 1) in a fluidized bead reactor, which means the particles are stirred by the gas and that the reaction occurs in a closed reactor where the gas the flowed through the reactor, at 500-900°C. This temperature range is below the melting points of the taught oxides and sulfides. The taught calcium and strontium sulfides are doped with rare earth metals, such as europium and samarium. Thus the reference teaches a collection of rare earth

doped strontium or calcium sulfide particles, where the rare earth metal comprises europium. Column 10, lines 46-60 teach the particle size of the phosphor is essentially the same as that of the precursor particles. Column 11, lines 2-3 teaches the phosphor particles, and accordingly the precursor particles, can have a size of 100 nm up to 1 micron. This means the average particle size is also in this range. These particles overlap the ranges in claims 16, 18 and 21. The reference suggests the claimed process and particles.

Applicants argue that the average particle size for the taught range is 500-600, but applicants are ignoring the teaching in the examples that shows that the particles have a distributions with in the range, not that the size distribution of all the particles produced by this process is 100 nm up to 1 micron (example 5). The rejection is maintained.

Claims 16, 18-22, 24-27, 29, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. patent 6,645,398.

This reference teaches a collection of metal sulfide phosphor particles having an average particle size in the range of about 100 nm up to about 5 microns, where at least 95 % of the particles are not larger than 1.5 times the average particle size (col. 38, lines 1-25). Thus the taught average size range and maximum size range overlaps the claimed ranges. Column 35, line 29 through column 36, line 20 and table 1 teaches the metal sulfide can be rare earth doped metal sulfide, where amount of dopant is 0.02-15 at%, which is the same as mole percent in phosphors. This range overlaps the claimed range. The exemplified sulfides include cerium doped strontium sulfide, europium doped calcium and/or strontium sulfide and rare earth metal doped zinc sulfide. Figure 61 shows that the particles have crystal facets due to the crystallinity of the particles. Column 37, lines 41-50 teaches the sulfide particles can be produced by contacting a

metal oxide powder with dihydrogen sulfide gas at 800-1100°C, which is below the melting point of the taught oxides and sulfides, which means the reaction must occur in a closed reactor. Example 7 teaches the dihydrogen sulfide gas flows through the reactor. The taught oxides particles are produced by the spray conversion process discussed in the reference, which means the oxides have having an average particle size in the range of about 100 nm up to about 5 microns, which overlaps the claimed range. While the reference does not teach the reaction occurs with stirring, one of ordinary skill in the art would have found it obvious to stir during the reaction to ensure all the particles are exposed to the carbon disulfide gas. The reference suggests the claimed process and particles.

Applicants argue the Examiner has not provided any evidence that one of ordinary skill in the would consider stirring as appropriate for roasting or heating reactors, but such reactors are notoriously well known. In fact, the heat treatment reactors disclosed in the specification are a type of roasting reactor. The rejection is maintained.

Claims 1-14 and 33-37 are allowed for the reasons given in the previous actions.

Claims 23 and 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

There is no teaching or suggestion in the cited art of record of producing metalloid sulfide particles having a particle size of less than about 500 nm by the claimed process.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melissa Koslow whose telephone number is (571) 272-1371. The examiner can normally be reached on Monday-Friday from 8:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo, can be reached at (571) 272-1233.

The fax number for all official communications is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

cmk
July 29, 2005

C. Melissa Koslow
Primary Examiner
Tech. Center 1700